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Utilization and Evaluation of Moringa Oleifera L. As Poultry Feeds

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Abstract

Three studies were conducted to evaluate the effects of *Moringa oleifera* leaf powder and leaf meal on chicken layer and broiler diets. The effect of different levels of *Moringa oleifera leaf powder (MOLP) on* laying performance of 480 Lohmann LSL Classic, 27- week old and the post-molting performance of 240 heads, 89- week old forced-molted Lohmann LSL Classic with 72% egg production were both conducted in four months. They were randomly distributed in Completely Randomized Design (CRD) to 5 dietary treatments with 6-replicate per treatment. One hundred fifty day-old Cobbs broiler were randomly assigned to five dietary treatments in Complete Randomized Design (CRD) with 30 birds per treatment. The treatments include: T1- Basal diets; T2-0.20% MOLM; T3-0.30% MOLM; T4-0.40% MOLM; T5-0.50% MOLM. The results reveal that feed consumption, FCR, % egg production, income over feed cost, sensory characteristics of egg and shell thickness of 27-42 and 89-101 week old layers were not significantly different ($P<0.05$).Egg weight and feed cost per kg of egg produced of forced- molted layers were significantly different ($P>0.05$). Broiler performance in-terms of ADG, feed intake, FCR, final weight and income over feed cost were not relatively better over the control.

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Keywords: Moringa oleifera leaf powder, leaf meal, chicken layer, cobs broiler

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1. Introduction

With the continuing increase in demand of raw feed materials that will suffice the needs of animal growers, a call for extensive search on utilization of the cheap and quality alternative feed sources from indigenous plant species was formulated. The development of the potential indigenous plants as sources of animal feedstuffs might not only decrease dependency of the feed industry on expensive imported feed ingredients but relatively reduces the production cost leading to the animal grower's economic efficiency. Food and Agriculture Organization (1996) the numerous uses of *Moringa oleifera* as medicine, low cost water purifier (flocculant), human food and animal feed, hedge, seed oil, fiber, its easy propagation and pan tropical cultivation justify more intensive research into its biological and economic possibilities particularly as useful feed ingredients and medicines.

The limited studies on the effects and usage of the plant leaves as feed ingredient are breakthroughs towards extensive investigation of its possibilities and viability as a feed source. The essential nutrient contents of *Moringa* leaves/twigs such as Vitamin A & B-vitamins, calcium, iron, copper, sulfur and protein and its ability to absorb and neutralize toxic elements in food could justify its significance in developing the plant as one of the major local feed stuffs (Lanaon 2007). With the application of proper processing techniques, high value *Moringa oleifera* leaf meals can be comparably produced with the existing ones in the industry today**.**

2. Materials and Methods

2.1. Effect of Diet Supplemented with Varying Levels of Moringa Oleifera Leaf Powder on Chicken Laying Performance and Egg Quality

A total of 480 Lohmann LSL-Classic, 27 weeks of age were used in 4-month feeding trial. They were randomly distributed to five dietary treatments in complete randomized design (CRD) with six replicates per treatment with 16 layers per replicate. The experimental treatments are as follows:

- T1- Basal diets/control
- T2- 0.2% *Moringa* leaf powder of the layer diet
- T3- 0.4% *Moringa* leaf powder of the layer diet
- T4- 0.6% *Moringa* leaf powder of the layer diet
- T5- 0.8% *Moringa* leaf powder of the layer diet

The biological performance of the birds were determined based on hen-day egg production, daily feed consumption, %egg production, hen-day egg production and mortality were taken. Egg weight and sizes were recorded daily while feed efficiency and egg quality were measured on a bimonthly basis. The methods applied by Bueno and Espiritu, 2005 on sensory egg evaluation were used;

- Flavor: 6= rich full flavor; 5= full flavor ; 4= slightly full flavor ; 3 =neither full or weak flavor; 2 = slightly weak flavor; 1= moderately weak flavor.
- Off-flavor: 6= very strong off-flavor; 5=strong off-flavor; 4= slightly off-flavor; 3= highly perceptible; 2= moderately perceptible; 1= slightly perceptible.
- General acceptability: 6=very desirable; 5=desirable; 4= slightly desirable; 3= neither desirable nor undesirable; 2= slightly undesirable. 1= moderately undesirable

Significant differences among the means were determined using one-way analysis of variance (ANOVA) and DMRT at 5% level of significance. The computer software SAS Version 6.2 was used to facilitate mathematical calculations.

2.2. Effect of Diet Supplemented with Varying Levels of Moringa Oleifera Leaf Powder on Laying Performance and Egg Quality of Force Molted Hens.

A total of 240 heads, 89- weeks old Lohmann LSL Classic strain with average egg production of 72 percent was used in 3-month feeding trial. They were randomly distributed in five dietary treatments to Complete Randomized Design (CRD). Each treatment is replicated six times with eight layers per replicate. The experimental treatments are : T1- Control, 0% *MOLP*; T2- 0.5% *Moringa oleifera leaf powder*; T3- 0.75% *Moringa oleifera leaf powder*;T4- 1.0% *Moringa oleifera leaf powder.* Significant differences among means were determined using one-way analysis of variance (ANOVA) and DMRT at 5% level of significance.

2.3. Growth Performance of Broiler (Gallus Domesticus L.) Fed Diets Supplemented with Moringa Oleifera Leaf Meal

This study was conducted to evaluate the biological performance and productivity of broilers as affected by *Moringa oleifera* leaf meal in the ration based on feed consumption, ADG, feed efficiency, weight gain, final weight of broilers and production efficiency.

A total of 150 day-old Cobbs broiler chicks were used in 35 day feeding trial. They were randomly distributed to five dietary treatments in Complete Randomized Design (CRD) consisted of three replicates per treatment with 10 birds per replicate. The experimental treatments include:T1 Basal Diets/ Control; T2- 0.1% of *Moringa oleifera* leaf meal (1.0g MOLM/1.0kg of the feed);T2-0.2% of *Moringa oleifera* leaf meal (2.0g MOLM/1.0kg of the feed);T3- 0.3% of *Moringa oleifera* leaf meal (3.0g MOLM/ 1.0kg of the feed);T4- 0.4% of *Moringa oleifera* leaf meal (4.0g MOLM/1.0kg of the feed);T5- 0.5% of *Moringa* leaf meal (5.0g MOLM/1.0kg of the feed). The data was subjected to one-way analysis of variance (ANOVA) to determine the significant differences among treatment means using DMRT at 5% level of significance.

3. Results and Discussion

3.1. Effect of Diet Supplemented with Varying Levels of Moringa Oleifera Leaf Powder (MOLP) on Chicken Laying Performance and Egg Quality.

The results reveal that the monthly laying percentage of 27 to 40 week-old Lohmann layers were not (P>0.05) significantly affected by the treated diets. The rate of lay was higher among treatments ranging from 90.04% at week 27 to 93.25% at week 44. F S Nouala *et al*.,(2006) observed that the In Vitro Digestibility (IVTD) was not significantly different between conventional concentrates and *Moringa oleifera* alone at 10% and 20% level of supplementation. TS Olegbemi *et al,* 2010 Feed intake, feed conversion ratio and laying percentage, yolk color were not influenced by the inclusion of MOLM except for general acceptability at the rate of 10% MOLM.

The same findings were observed in egg production (hen-day) during the feeding trial. The egg quality on the other hand was not affected (P0>05) by the diets with the average shell thickness ranging to 0.328mm-0.340 while the yolk color (Roche Yolk Color) had a color intensity of 6.167- 7.167.

Comparable results were also observed from the egg weight and sensory characteristics of eggs of the treated diets. Olugbemi T S *et al.*, (2010) found out that serum cholesterol levels at 0,5& 10% MOLP in dietary treatments declined by 14.2%,19.8% and 22.0 %, respectively, while yolk cholesterol levels declined by 6.55%, 7.45% and 12.1%, respectively.

Kakengi A M V *et. al*, (2007) observed that egg weight was significantly highest in MOLM-0 and lowest in MOLM-10. Further, laying percentage (LP) showed a significant progressive decreasing trend as MOLM

proportion increased in the diet. The findings only indicate that MOLP in layer diets did not generally influence on the parameters evaluated in this study.

3.2. Effect of Moringa Oleifera Leaf Powder (MOLP) on Laying Performance on Forced Molted Hens

The results indicate that feeding of *Moringa* leaf powder on the forced-molted Lohmann layers from week 89-101 did not influence the production performance such as feed consumption, rate of lay, FCR and egg production (hen-day) of the birds except for the egg weight in which more heavier eggs were produced from the treated diets (P0<0.5).

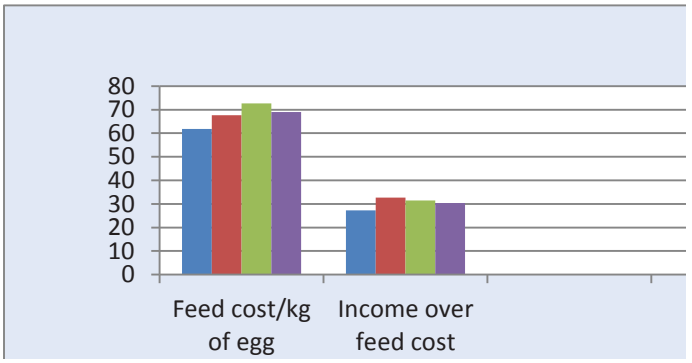

Fig.1. Economic benefits of MLP on forced-molted hens

Figure 1 shows that feed cost/kg of egg produced was significantly increased (P0>.01) by the addition of MLP in the layer ration. The income over feed cost however was not affected.

3.3. Growth Performance of Broiler (Gallus Domesticus L.) Fed Diets Supplemented with Moringa Leaf Meal

The addition of *Moringa* leaf powder on broiler diets did not (P>0.05) significantly influence the broiler's feed intake, ADG, feed conversion ratio (FCR), feed intake (FI) final weight, feed cost per kg of broiler produced and Income over feed and chick cost. The results contradicts with the findings of Fernandez et al.,2002 that MoALE in drinking water significantly decreased feed intake of broilers. Olugbemi *et al.,* (2010) observed the reduction in performance of broiler at inclusion level of MOLM beyond 5% in feed, the final weight, FCR and ADG on the other hand were not significantly .

4. Conclusion and Recommendation

The results of the three feeding trials showed that *Moringa* feed supplements did not further improve the parameters used except forced-molted layers that significant increased on feed cost per kg of egg produced and egg weight were recorded. The average cumulative feed efficiency, laying percentage, feed consumption and income over feed cost of the chicken layers fed diets with varying amounts of MLP were statistically comparable with the basal diets. The results however were constantly higher with the values obtained from the control groups.

Similar findings on broilers' production performance from the treated and control groups were observed. The ADG, gain in weight, FCR, feed intake, final weight and income over feed cost were statistically

comparable among the treatment groups.

Nevertheless, despite of the statistically comparable results between the basal rations and compound poultry feeds supplemented with varying levels of *Moringa* leaf powder, it's utilization in poultry diets could be employed particularly for the small farm holders as natural and healthy feed replacements to synthetic feed supplements.

Finally, for optimum production performance, follow-up studies on utilization of enzyme enriched *Moringa* leaf powder and leaf meal shall be conducted for egg and meat production. The study using the parameters that will evaluate egg quality, digestibility rate shall also be conducted.

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